

## WHAT IS CLAIMED IS:

1. A vehicle occupant detection system comprising
  - an auxiliary light projection apparatus for projecting auxiliary light which is within a predetermined range of wavelengths into a predetermined region of a vehicle interior, said predetermined region including a vehicle seat,
    - a camera apparatus for photographing an image of said predetermined region, said image being expressed as digital data, with light that is within at least a part of the range of visible wavelengths being excluded when photographing said image, and
      - an image processing apparatus for applying image processing to said data expressing said image, to derive information indicative of a condition of an occupant of said vehicle seat.
  2. A vehicle occupant detection system as claimed in claim 1, wherein said predetermined range of wavelengths of said auxiliary light includes at least a part of the near infra-red range, wherein said camera apparatus comprises a digital camera having a spectral sensitivity which extends to said part of the near infra-red range, and wherein said system comprises an optical filter disposed in a path of incident light which enters said digital camera, with said

optical filter adapted to pass light that is within at least a part of said near infra-red range and to block light that is within a part of the range of visible wavelengths.

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3. A vehicle occupant detection system as claimed in claim 1, wherein said auxiliary light projection apparatus projects said auxiliary light irrespective of a level of brightness within said vehicle interior.

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4. A vehicle occupant detection system as claimed in claim 1, wherein said auxiliary light emitted from said auxiliary light projection apparatus is set at an emission output level such that said image photographed by said camera apparatus is not affected by reflections of said auxiliary light from glass surfaces of said vehicle interior, including surfaces of a windshield and side windows of said vehicle.

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5. A vehicle occupant detection system as claimed in claim 1, wherein said auxiliary light projection apparatus comprises a plurality of light sources which project auxiliary light into respectively different regions of said vehicle interior, and wherein said light sources are successively activated in respective light emission

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intervals during an exposure interval of said camera apparatus.

6. A vehicle occupant detection system as claimed in  
5 claim 1, wherein said camera apparatus is mounted on a front part of a ceiling of said vehicle interior at a location which is substantially midway between left and right sides of said vehicle interior.

10 7. A vehicle occupant detection system as claimed in claim 1, wherein said auxiliary light projection apparatus is mounted on a front part of a ceiling of said vehicle interior at a location which is substantially midway between left and right sides of said vehicle interior.

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8. A vehicle occupant detection system as claimed in claim 1, wherein said information derived by said image processing apparatus is indicative of a position of a head of said occupant of said vehicle seat.

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9. A vehicle occupant detection system as claimed in claim 1, wherein said information derived by said image processing apparatus is indicative of a size of a head of said occupant of said vehicle seat

10. A vehicle occupant detection system as claimed in  
claim 1, wherein said predetermined region within said  
vehicle interior includes a position close to an exit  
5 aperture of an air bag corresponding to said vehicle seat.

11. A vehicle occupant detection system as claimed in  
claim 10, wherein said predetermined region includes a  
position close to a head rest portion of said vehicle seat.

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12. A vehicle occupant detection system as claimed in  
claim 11, wherein said information derived by said image  
processing apparatus is indicative of a distance between a  
head of said occupant of said vehicle seat and said air bag  
15 exit aperture

13. A vehicle occupant detection system as claimed in  
claim 11, wherein said camera apparatus is mounted on said  
ceiling of said vehicle interior at a location which is  
20 intermediate between said air bag exit apparatus and said  
head rest portion of said vehicle seat, with respect to a  
longitudinal direction of said vehicle.